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(54) Title: A METHOD OF CONDITIONING IRON ALLOY-BASED ANODES FOR ALUMINIUM ELECTROWINNING CELLS

(57) Abstract: A metallic aluminium electrowinning anode structure has initially an iron-based alloy outer part with an active anode surface which is essentially metallic and free of any ceramic compounds of metals from the metallic. The anode structure undergoes a conditioning treatment that includes: substantially preventing the essentially metallic active surface free of said ceramic compound from reacting with any reactable species, in particular oxygen and fluorine species, until immersion into a molten electrolyte containing oxygen ions; immersing into the molten electrolyte the metallic anode structure with its essentially metallic active surface free of said ceramic compounds; and polarising the immersed metallic anode structure to form on the metallic anode structure a dense and coherent integral iron-based oxide layer which is electrochemically active for the oxidation of oxygen and which inhibits diffusion of oxygen towards the metallic anode structure. The metallic anode structure can be covered with a temporary protection medium, e.g. a protective layer, that prevents ceramic-forming reactions at the metallic anode surface and is separable before or upon immersion into the electrolyte.

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# INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C25C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 03 014420 A (MOLTECH INVENT S.A.) 20 February 2003 (2003-02-20) cited in the application  page 7, line 33 -page 8, line 7 page 11, line 25 -page 12, line 34 page 17; claim 1 page 20; claims 21-26	1,6,7,9, 13-15, 17-21, 32,33
A	US 5 904 828 A (JAINAGESH A. SEKHAR) 18 May 1999 (1999-05-18) column 6, line 45 - line 49 column 8; claim 1	1
A	WO 01 42536 A (MOLTECH INVENT S.A.) 14 June 2001 (2001-06-14) cited in the application page 17 -page 18; example 5	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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